

REMARKS

Status of Claims

Claims 1-11 are pending in this application, the independent claims being claims 1, 6, and 7.

Summary of Official Action

In the Office Action, claims 1-11 were rejected under 35 U.S.C. §103(a), as unpatentable over U.S. Patent No. 6,013,339 to Yamada. Reconsideration and withdrawal of the rejection respectfully are requested in view of the following remarks.

Summary of Examiner Interview

Applicant's attorney gratefully acknowledges the courtesies extended to him by the Examiner in granting a personal interview on June 29, 2005. In that interview, Applicant's attorney discussed various novel features of the claimed invention, discussed the cited prior art, and distinguished the claimed invention over the cited art. Applicant's attorney also presented arguments why one of ordinary skill in the art would not have been motivated to combine various disparate features in the cited art to achieve the claimed invention. The Examiner agreed to further consider such arguments upon the filing of a response to the Official Action including such arguments. The arguments presented in the Interview are incorporated in the present remarks.

Claimed Invention

The present invention relates to a novel liquid crystal device and methods of making a liquid crystal device. In one aspect, as recited in claim 1, the claimed invention relates to a liquid crystal device, comprising a pair of substrates, a liquid crystal layer provided between the pair of substrates, and a sealing material bonding the pair of substrates to each other and enclosing the liquid crystal layer between the pair of substrates. The sealing material contains

a photocurable component and a thermosetting component; the photocurable component has a maximum curing rate in the range of from 60% to 95%, and the thermosetting component has a curing rate in the range of from 60% to 90%. The liquid crystal device further comprises a member disposed at a position corresponding to the sealing material, where the member at least partially blocks ultraviolet rays so that the photocurable component at portions of the sealing material that correspond to the member has a curing rate of less than 60%.

In another aspect, as recited in claim 6, the claimed invention relates to a method for manufacturing a liquid crystal device having a liquid crystal layer provided between a pair of substrates. The method comprises the steps of applying an adhesive onto at least one of surfaces of the pair of substrates to form a closed frame shape in a region of the surface thereof, disposing spacers on at least one of the surfaces of the pair of substrates, dripping liquid crystal onto at least one of surfaces of the pair of substrates after the adhesive and the spacers are disposed, bonding the pair of substrates to each other after the liquid crystal is dripped, and curing the adhesive after the bonding is performed, where the adhesive is an uncured material which is formed to a sealing material by curing, the sealing material contains a photocurable component and a thermosetting component, the photocurable component has a maximum curing rate in the range of from 60% to 95%, and the thermosetting component has a curing rate in the range of from 60% to 90%. The method further comprises the step of disposing a member at a position corresponding to the sealing material, where the member at least partially blocks ultraviolet rays so that the photocurable component at portions of the sealing material that correspond to the member has a curing rate of less than 60%.

In another aspect, as recited in claim 7, the claimed invention also relates to a method for manufacturing a liquid crystal device having a liquid crystal layer provided between a pair of substrates. In this aspect, the method comprises the steps of applying an adhesive onto at

least one of surfaces of the pair of substrates to form a frame shape provided with a liquid crystal inlet, disposing spacers on at least one of the surfaces of the pair of substrates, bonding the pair of substrates to each other after the adhesive and the spacers are disposed, curing the adhesive after the bonding is performed, and injecting liquid crystal inside the adhesive through the liquid crystal inlet, where the adhesive is an uncured material which is formed to a sealing material by curing, the sealing material contains a photocurable component and a thermosetting component, the photocurable component has a maximum curing rate in the range of from 60% to 95%, and the thermosetting component has a curing rate in the range of from 60% to 90%. The method further comprises the step of disposing a member at a position corresponding to the sealing material, where the member at least partially blocks ultraviolet rays so that the photocurable component at portions of the sealing material that correspond to the member has a curing rate of less than 60%.

Thus, in each aspect the claimed invention relates to a liquid crystal structure/method including a combination of features in which a light-blocking member (e.g., a color filter or metal wiring) is disposed at a position corresponding to the sealing material, where the member at least partially blocks ultraviolet rays so that the photocurable component at portions of the sealing material that correspond to the light-blocking member has a curing rate of less than 60%, **AND** the sealing material contains a photocurable component and a thermosetting component, the photocurable component has a maximum curing rate in the range of from 60% to 95%, and the thermosetting component has a curing rate in the range of from 60% to 90%. As discussed in greater detail in the present application, this combination of features provides a significant advantage over prior art structures and methods because it permits efficient utilization of space for arranging members of the liquid crystal device and provides desired sealing qualities (strength, flexibility, non-brittle, non-separation, etc.) of the sealing material.

Prior Art Distinguished

The rejection of claims 1-11 over the Yamada '339 patent and the Watanabe '398 patent respectfully is traversed.

Applicant submits that the prior art fails to anticipate the claimed invention. Moreover, Applicant submits that there are differences between the subject matter sought to be patented and the prior art, such that the subject matter taken as a whole would not have been obvious to one of ordinary skill in the art at the time the invention was made.

In particular, Applicant submits that the applied art, taken individually or in combination fails to disclose or suggest the features of a liquid crystal device comprising a member disposed at a position corresponding to the sealing material, where the member at least partially blocks ultraviolet rays so that the photocurable component at portions of the sealing material that correspond to the member has a curing rate of less than 60%, and the sealing material contains a photocurable component and a thermosetting component, where the photocurable component has a maximum curing rate in the range of from 60% to 95%, and the thermosetting component has a curing rate in the range of from 60% to 90%, as disclosed in the application and recited in claim 1. Nor is the applied art understood to teach a method for manufacturing such a liquid crystal device, as disclosed in the present application and recited in claims 6 and 7.

The Yamada '339 patent relates to a liquid crystal display panel, a seal material for a liquid crystal cell, and a liquid crystal display, and discloses a liquid crystal display including substrates 12A, 12B, a seal material 3, spacer material 2, and liquid crystal 13 (Figs. 5 and 8). The Yamada '339 patent teaches that by using a sealing material including an ultraviolet ray curing type component and a thermosetting type component, ultraviolet ray curing to provide a curing ratio of 60% or more of the ultraviolet ray curing resin in the sealing material (with a particle type thermosetting agent, the curing ratio is 50% or more), and thermosetting to

increase the curing ratio to 80% or more of the curing resin in the seal material, a liquid crystal display panel having a good display property can be obtained (col. 15, lines 66-col. 16, line 9). However, Applicant submits that the Yamada '339 patent fails to disclose or suggest at least the above-described combination of features of the claimed invention. As acknowledged in the Official Action, the Yamada '339 patent fails to disclose or suggest the feature of a sealing material having a maximum cure rate in the range of 60% - 95%. Nor does the Yamada '339 patent disclose or suggest a liquid crystal device structure/method including disposing a light-blocking member at a position corresponding to the sealing material, where the member blocks ultraviolet rays so that the photocurable component at portions of the sealing material has a curing rate of less than 60%.

The Watanabe '398 patent fails to remedy the deficiencies of the Yamada '339 patent. The Watanabe '398 patent relates to a liquid crystal display device and method of fabricating the same, and discloses a liquid crystal display device including wiring members that block a photocurable material during manufacture. However, Applicant submits that the Watanabe '398 patent fails to disclose or suggest the above-discussed combination of features of the claimed invention. Rather, the Watanabe '398 patent teaches that non-uniform curing of the sealing material is undesirable; an express object of the Watanabe '398 patent is to realize approximately uniform curing. The Watanabe '398 patent achieves this objective by controlling physical layout of the liquid crystal device. Specifically, the Watanabe '398 patent teaches to provide a light blocking member in such a way that a non-overlapping area of the sealing member with the wiring lines and the light-blocking member is equal to 25% per unit area of the sealing member or greater. Accordingly, nowhere does the Watanabe '398 patent teach the combined features of disposing a light-blocking member at a position corresponding to the sealing material, where the member at least partially blocks ultraviolet rays so that the photocurable component at portions of the sealing material that correspond to the light-

blocking member has a curing rate of less than 60%, **AND** the sealing material contains a photocurable component and a thermosetting component, the photocurable component has a maximum curing rate in the range of from 60% to 95%,

Moreover, in light of the Watanabe '398 patent teaching to provide a substantially uniform curing rate, Applicant submits that one of ordinary skill in the art would have not have been motivated to combine the teachings of the Watanabe '398 with the teachings of the Yamada '339 patent to achieve the claimed invention.

For at least the above reasons, Applicant submits that claims 1, 6 and 7 are allowable.

Claims 2-5 and 8-11 depend from claims 1 and 6, and are believed allowable for the same reasons. Moreover, each of these dependent claims recites additional features in combination with the features of its respective base claim, and is believed allowable in its own right. Individual consideration of the dependent claims respectfully is requested

Entry of This Response is Proper

Applicant respectfully requests that the present Request for Reconsideration be entered under 37 CFR 1.116. Applicant has presented no amendments to the claims or application. Applicant submits that the remarks presented herein were necessitated by the Examiner's comments in the Official Action and the Interview. Applicant believes that the Request addresses the Examiner's comments, re-presents arguments traversing the outstanding rejections, and does not raise any significant new issues for consideration.

Conclusion

Applicant believes that the present Summary of Examiner Interview and Request for Reconsideration is responsive to each of the points raised by the Examiner in the Official Action and the June 29 Interview, and submits that the application is in condition for allowance. Favorable reconsideration of the claims and passage to issue of the application at the Examiner's earliest convenience earnestly are solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,

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JAO:CPW/

Date: July 29, 2005

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